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ST Kavar

M.Sc. (Agri.) Student,
Department of Extension
Education, Dr. P D KV, Akola,
Maharashtra, India

RT Katole

Associate Professor, Department
of Extension Education, Dr. P D
KV, Akola, Maharashtra, India

Swati Gawande

Assistant Professor, Department
of Extension Education, Dr. P D
KV, Akola, Maharashtra, India

Priti Todasam

Senior Research Assistant,
Department of Extension
Education, Dr. P D KV, Akola,
Maharashtra, India

Corresponding Author:**ST Kavar**

M.Sc. (Agri.) Student,
Department of Extension
Education, Dr. P D KV, Akola,
Maharashtra, India

Correlates of adoption of recommended cultivation practices of gram (*Cicer arietinum* L.) by the farmers

ST Kavar, RT Katole, Swati Gawande and Priti Todasam

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Abstract

Gram (*Cicer arietinum* L.) is leguminous pulse crop which belongs to *Leguminosae* family. It important pulse crop from nutrition point of view. Pulses are main source of protein in vegetarian diet. Legume has unique role in human and animal nutrition as well as in improvement of soil fertility by improving physico chemical and biological properties of soil. India is the largest producer of pulses in the world with (24.00%) share in the global production.

Practice wise adoption (71.67%) respondents had full adoption of land preparation, and sowing method practices, followed by (70.84%) and (68.33%) had full adoption of types of soil required and sowing time practices, respectively. While, (17.50%) seed treatment, and (9.17%) had full adoption of recommended FYM application practices.

In case of adoption education, land holding, annual income and sources of information of the respondents are positively and significantly correlated with adoption of farmers. These relationships were significant at 0.01 per cent level of probability and area under gram, innovativeness and economic motivation are significant at 0.05 per cent level of probability. However, age was found negatively non-significant and source of irrigation and insurance availed were non-significant with the adoption.

The findings pertaining the constraints faced by farmers in adoption of recommended cultivation practices of gram, were majority of (56.67%) respondents faced the low market prices of gram, (53.54%) lack of knowledge about seed treatment, (48.33%) high labour wages, (39.17%) non-availability of labour and crop damaged by wild animal (35.00%).

Keywords: Correlates, leguminous and adoption

Introduction

Agriculture being one of the major sector associated with country's population has attracted much attention since independence. India grows a variety of pulse crop under a wide range of agro-climatic conditions and has a pride of being the world's largest producer of pulses in the world. India is the largest producer of pulses in the world with (24.00%) share in the global production.

Gram (*Cicer arietinum* L.) is leguminous pulse crop which belongs to *Leguminosae* family. It important pulse crop from nutrition point of view. Pulses are main source of protein in vegetarian diet. Legume has unique role in human and animal nutrition as well as in improvement of soil fertility by improving physico chemical and biological properties of soil.

Gram is commonly known by various names in different states of India such as chana, chickpea, harbara, chhole and bengal gram. The name chana has been mostly derived from sanskrit word 'chanakam' or 'chennuka'. The most common Indian name is gram. Gram contains (21.10%) protein, (61.50%) Carbohydrates and (2.4-5.0%) Fats. Besides its contain Iron, Calcium, Niacin in sufficient quantity and also contain Malic acid and Oxalic acid.

It is used for human consumption as well as for feeding to animals. It is eaten both whole fried or boiled and salted or more generally in the form of the split pulse which is cooked and eaten. Both husks and bits of the 'dal' are valuable cattle feed. Fresh green leaves used as vegetables (sag). The grains are also used as vegetables (chhole). Chick pea flour (besan) is used in the preparation of various types of sweets. Gram is considered to have medicinal effects and it is used for blood purification.

Objectives

1. To study the profile of farmers
2. To study the extent of adoption of recommended cultivation practices of gram by the farmers
3. To study the relationship of selected characteristics of farmers with their adoption of recommended cultivation practices of gram
4. To identify the constraints faced by the farmers in adoption of recommended cultivation practices of gram

Methodology

The present study was based on exploratory design social research to measure the adoption of recommended cultivation practices of gram by the farmers. Present study was conducted in Amravati district of Maharashtra state considering

maximum area under gram and therefore, Amravati district comprises of total 14 talukas out of them Amravati and Bhatkuli talukas were purposively selected for present study and five villages were purposively selected and twelve respondents were selected from each village by random sampling method, making a sample size of 120 in total. The data collected was put to correlation and regression.

Results and Discussion

The study was made with reference to age, education, land holding, annual income, area under gram, sources of information, source of irrigation, insurance availed, innovativeness, economic motivation and the results have been furnished as follows

Table 1: Distribution of respondents according to their characteristics

Sr. No.	Category	Respondents (n=120)	
		Number	Percent
1	Age (Years)		
	i) Young (Up to 35)	33	27.50
	ii) Middle (36-50)	61	50.83
	iii) Old (Above 50)	26	21.67
2	Education		
	i) Illiterate (No schooling)	2	01.67
	ii) Primary school (Up to 4 th std.)	12	10.00
	iii) Middle school (5 th to 7 th std)	19	15.83
	iv) High school (8 th to 10 th std.)	53	44.16
	v) Higher secondary (11 th to 12 th)	26	21.67
	vi) Graduation (Above 12 th)	8	06.67
3	Land holding (ha)		
	i) Marginal (Up to 1.00 ha)	13	10.83
	ii) Small (1.01 to 2.00 ha)	39	32.50
	iii) Semi-medium (2.01 to 4.00 ha)	53	44.17
	iv) Medium (4.01 to 10.00 ha)	12	10.00
	v) Large (Above 10.00 ha)	3	2.50
4	Annual income (Rs.)		
	i) Up to Rs. 50,000	08	6.67
	ii) Rs. 50,001 to 1,00,000	27	22.50
	iii) Rs. 1,00,001 to 1,50,000	33	27.50
	iv) Rs. 1,50,001 to 2,00,000	34	28.33
	v) Above Rs. 2,00,000	18	15.00
5	Area under Gram		
	i) Small (Up to 1.00 ha)	57	47.50
	ii) Medium (1.01 to 02.00 ha)	44	36.67
	iii) Large (Above 2.00 ha)	19	15.83
6	Sources of information		
	i) Low (Up to 17.62)	27	22.50
	ii) Medium (17.63 to 26.16)	76	63.33
	iii) High (Above 26.16)	17	14.17
7	Sources of irrigation		
	i) No source	11	09.17
	ii) River	15	12.50
	iii) Well / Tube well	84	70.00
	iv) Canal	06	05.00
	v) Farm ponds	04	03.33
8	Insurance availed		
	i) Yes	5. 89	6. 74.17
	ii) No	7. 31	8. 25.83
9	Innovativeness		
	i) Low (Up to 9.56)	24	20.00
	ii) Medium (9.57 to 14.44)	78	65.00
	iii) High (Above 14.44)	18	15.00
10	Economic motivation		
	i) Low (Up to 15.97)	26	21.67
	ii) Medium (15.98 to 22.91)	55	45.83
	iii) High (Above 22.91)	39	32.50

1. Age

Age is normally an indicator of the maturity, experience and depth of knowledge. Hence, it has been considered in the present study. The age wise distribution of respondents has been presented in Table 1

From Table 1, it has been observed that majority (50.83%) of respondents were in middle age category i.e. between 36 to 50 years, 27.50 per cent of respondents in young age category i.e. up to 35 years and 21.67 per cent in old age i.e. above 50 year category. Thus, it can be concluded that majority (50.83%) of respondents were in middle age category.

The above findings are in accordance with the observations of Bansal (2015) ^[3].

2. Education

Education has been considered as one of the important variable with help of which the social change can be achieved. The education of the respondents was studied and the results have been presented in the Table 1.

From Table 1, it is observed that 44.16 per cent of the respondents were educated up to high school level, followed by 21.67 per cent were educated up to higher secondary school and 15.83 and 10.00 per cent of respondents were educated up to middle school and primary school level, respectively. 6.67 per cent of the respondents were educated up to graduation and 1.67 per cent of respondents found illiterate.

Thus, it is that higher proportion of respondents had education 44.16 per cent up to high school level.

The above findings are in accordance with the observations of Mane (2001) ^[10] and Ramteke (2001) ^[11].

3. Land holding

Land holding was observed as an important variable of the farming occupation. It provides the workable area to the farmer so that, they can get more chances to apply recommended production practices of various crops on farm. Hence, it has been considered in the present study and the result has been presented in Table 1.

Thus, it is concluded that (44.17%) respondents are found in semi-medium land holding category, followed by 32.50 per cent small land holding category. The findings are similar with Surve (2014) ^[13].

4. Annual income

Annual income provides the availability of the capital for farming. The result obtained has been presented in the following Table 1.

Thus, it is concluded that (28.33%) respondents belonged to Rs.1, 50, 001 to Rs. 2, 0, 000 of annual income category. These finding were supported by Khare (2013) ^[9].

5. Area under gram

The observations regarding area under gram cultivation of the respondents were shown in Table 1.

Thus, nearly fifty per cent (47.50%) of the respondents had small area (Up to 01.00 ha) under gram cultivation. These Study was supported by Kharat (2012) ^[8] and Surve (2014) ^[13].

6. Sources of information

The data from Table 1, indicates that use of various sources of

information by the farmers about recommended cultivation practices of gram.

The data in Table 8, revealed that majority (63.33%) of the respondents had medium level of sources of information, 22.50 per cent of respondents had low level of sources of information and 14.17 per cent of respondents had high level of sources of information.

Thus, it is concluded that majority of the respondents (63.33%) had medium level of sources of information. These findings were supported by Divakar (2011) ^[5].

7. Source of irrigation

The sources of irrigation are quite useful to increase the productivity, hence it is included in the study and result has been presented in Table 1

From Table 1, it is revealed that majority of 70.00 per cent of respondents had well/tube as a source of irrigation, followed by (12.50%) of respondents were used river for irrigation and 05.00 per cent had canal and 3.33 per cent had farm ponds as a source of irrigation whereas, 9.67 per cent respondents had no source of irrigation. Thus, majority of the respondents 70.00 per cent had well/tube well as a source of irrigation. The similar findings also found by Gavade (2013) ^[6] and Ghube (2014) ^[7].

8. Insurance availed

The distribution of the respondents according to Insurance availed is shown in Table 1.

From Table 1, it is observed that majority of (74.17%) respondents had Insurance availed and 25.83 per cent respondents had not Insurance availed. Thus, it is it is observed that majority of (74.17%) respondents had Insurance availed. This study is least similar with Uvaneswaran and Mohanapriya (2014)

9. Innovativeness

The distribution of the respondents according to their innovativeness is shown in Table 1.

From Table 11, it is elicited that majority of 65.00 per cent respondents were observed in medium level of innovativeness, 20.00 per cent of respondents were observed in low level of innovativeness and 15.00 per cent respondents were having high level of innovativeness.

Thus, it is concluded that majority of 65.00 per cent respondent had medium level of innovativeness.

10. Economic motivation

From Table 1, It is observed that (45.83%) respondents had medium level of economic motivation followed by 32.50 per cent of the respondents were having high level of economic motivation and 21.67 per cent of respondents were in low level of economic motivation.

Thus, it is concluded that majority 45.83 per cent of respondents had medium level of economic motivation. It is inferred from above findings are line with Tripathi (2006).

1. Adoption

Adoption possessed by farmers about recommended cultivation practices of was studied and the results have been presented in Table 15.

Table 15: Distribution of respondents according to their adoption of recommended cultivation practices of gram

Sl. No.	Recommended practice	Respondents (n=120)		
		FA	PA	NA
1.	Land preparation Ploughing once in 3 year and 1-2 harrowing	86(71.67)	21 (17.50)	13 (10.83)
2.	Types of soil required (Sandy loam to clay loam or black cotton soil)	85 (70.84)	22 (18.33)	13 (10.83)
3.	Sowing method : Drilling	86 (71.67)	24 (20.00)	10 (8.33)
4.	Sowing time	82 (68.33)	31 (25.83)	07 (5.84)
5.	Seed rate: 70-85 kg/ha	57 (47.50)	13 (10.83)	50 (41.67)
6.	Varieties (JAKI-9218,Vijay, Chafa, PDKV-Kanchan)	44 (36.67)	11 (9.17)	65 (56.16)
7.	Spacing : 30 cm x 10 cm	52 (43.33)	17 (14.17)	51 (42.50)
8.	Seed treatment: Trichoderma (4g/kg seed) + Rhizobium (25g/kg seed) + (PSB 25g/kg seed)	21 (17.50)	28 (23.33)	71 (59.17)
9.	Recommended FYM application (5-10 tonnes/ha)	11 (09.17)	34 (28.33)	75 (62.50)
10.	Recommended fertilizer application (25:50:30 N:P:K kg/ha)	29 (24.17)	22 (18.33)	69 (57.50)
11.	Irrigation application at critical stages	52 (43.33)	27 (22.50)	41 (34.17)
12.	Weed management	46 (38.33)	29 (24.17)	45 (37.50)
13.	Plant protection: Disease and Pest control	55 (45.84)	21 (17.50)	44 (36.66)
14.	Harvesting	81 (67.50)	33 (27.50)	6 (5.00)

(Figures in parenthesis indicates percentage)

FA- Full adoption, PA- Partial adoption, NA- Non adoption

The data in table 15, indicate that (71.67%) respondents had full adoption of land preparation, and sowing method practices, followed by (70.84%) and (68.33%) had full adoption of types of soil required and sowing time practices, respectively.

More than two third (67.50%) respondents had full adoption of harvesting practices, (47.50%) seed rate and (45.84%) had full adoption of plant protection practices. Equal percent of

(43.33%) respondents had full adoption of spacing and irrigation application at critical stages. However (38.33%) respondents had full adoption of weed management and (36.67%) had fully adopted recommended varieties of gram. While, meager per cent (24.17%) of respondents had full adoption of recommended fertilizer application, (17.50%) seed treatment, and (9.17%) had full adoption of recommended FYM application practices.

Table 16: Categorization of respondents according to their adoption of recommended cultivation practices of gram

Sl. No.	Level of adoption	Respondents (n=120)	
		Frequency	Percentage
1	Low (Up to 34.75)	27	22.50
2	Medium (34.76 to 70.43)	70	58.33
3	High (Above 70.43)	23	19.67
Total		120	100.00

Mean=52.59, SD=17.84

In case of partial adoption more than one fourth (28.33%), (27.50%) and (25.83%) respondents had partial adoption of recommended FYM application, harvesting and sowing time practices of gram, respectively. However, (24.17%) respondents had partial adoption weed management, (23.33%) seed treatment and (22.50%) respondents had partial adoption of irrigation application at critical stages, respectively. One fifth (20.00%) respondents had partial adoption sowing method, equal per cent (18.33%) respondents had partial adoption of types of soil required, recommended fertilizer application and plant protection, respectively. Equal per cent (17.50%) respondents had partial adoption of land preparation, and plant protection practices. While, (14.17%) respondents had partial adoption spacing, (10.83%) seed rate and (9.17%) respondents had partial adoption of

recommended varieties.

The data with regard to level of adoption of recommended cultivation practices of gram, it is indicate that majority (58.33%), respondents were in medium level of adoption whereas (22.50%) gram growers possessed high level of adoption and (19.67%) respondents possessed low level of adoption.

Thus, majority of respondents (58.33%), were in medium level of adoption. These finding of the present study are in the line with Ramteke (2001) [11].

Correlation analysis

Relationship between selected variables and adoption of respondents has been presented in Table 18.

Table 18: Coefficient of correlation of selected characteristics of the respondents with their adoption

Sl. No.	Variables	'r' values
1.	Age	-0.1357
2.	Education	0.3350**
3.	Land holding	0.3127**
4.	Annual income	0.2601**
5.	Area under gram	0.2371*
6.	Sources of information	0.2513**
7.	Source of irrigation	0.1353 NS
8.	Insurance availed	0.1124NS
9.	Innovativeness	0.2311*
10.	Economic motivation	0.2435*

** Significant at 0.01% level of probability, * Significant at 0.05% level of probability, NS- Non-significant

It was observed that from Table 18, education, land holding, annual income and sources of information of the respondents are positively and significantly correlated with adoption of farmers. These relationships were significant at 0.01 per cent level of probability and area under gram, innovativeness and economic motivation are significant at 0.05 per cent level of probability, and hence null (Ho) hypothesis in this case is

rejected. However, age was found negatively non-significant and source of irrigation and insurance availed non-significant with the adoption of farmers hence null (Ho) hypothesis in this case is accepted.

Constraints faced by farmers in adoption of recommended cultivation about practices of gram

Table 19: Constraints faced by farmers in adoption of recommended cultivation about practices of gram

Sl. No.	Constraints	Frequency (n=120)	Percentage	Rank
A	Production constraints			
1.	9. Non-availability of inputs	10. 36	11. 30.00	12. VIII
2.	13. Non-availability of irrigation facilities	14. 12	15. 10.00	16. X
B	Economical			
1.	17. High labour wages	18. 58	19. 48.33	20. III
2.	21. High cost of inputs	22. 46	23. 38.33	24. V
C	Technical			
1.	25. Lack of knowledge about seed treatment	26. 64	27. 53.54	28. II
2.	29. Non-availability of recommended varieties	30. 25	31. 20.83	32. IX
3.	33. Lack of knowledge about plant protection measures	34. 44	35. 36.66	36. VI
D	Situational			
	37. Non-availability of labour	38. 47	39. 39.17	40. VII
E	Market			
	41. Low market prices of gram	42. 68	43. 56.67	44. I
F	Other			
	45. Crop damaged by wild animal	46. 42	47. 35.00	48. VII

To identify the constraints faced by the farmers in adoption of recommended cultivation practices of gram is one of the objectives of present study. The constraints circumstances or causes which prohibit or restraint the farmers in adoption of recommended cultivation practices of gram.

It is observed that from Table 19, first rank quoted that majority of (56.67%) respondents faced the constraints of low market prices of gram, (53.54%) lack of knowledge about seed treatment it is second rank, (48.33%) high labour wages, (39.17%) non-availability of labour and (35.00%) crop damaged by wild animal. Further (38.00%) respondents faced the constraints of high cost of inputs, (36.66%) lack of knowledge about plant protection measures, (30.00%) non-availability of inputs (20.83%) non-availability of recommended varieties and (10.00%) non-availability of irrigation facilities, respectively. These finding are similar to Mane (2001)^[10] and Deshmukh (2006)^[4].

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